

WIT a mobile Waste Inspection Tomography Trailer[†]

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The Lawrence Livermore National Laboratory (LLNL) is developing a number of nondestructive evaluation (NDE) measurement modalities, some of them useful for the noninvasive interrogation of waste containers.¹ We are also developing an emerging nondestructive assay (NDA) technology that we call active (A) and passive (P) computed tomography (CT).² Usually, NDE measurement modalities are regarded as qualitative to semi-quantitative, while NDA technology is quantitative. We are working as a subcontractor to Bio-Imaging Research (BIR), Inc., to integrate our A&P CT technology into a mobile trailer that will have two additional nonintrusive technologies. When combined they will provide a complete x- and gamma-ray waste inspection tomography (WIT) capability.³

During the months of November through February the WIT trailer was at the LLNL waste drum storage yard. A summary of the trailer inspection capabilities—digital radiography (DR), transmission CT (TCT), single photon emission CT (SPECT) and A&PCT—and results obtained on mock- and TRU-waste drums will be presented. Representative 3D rendered results for WIT data on a TRU-waste drum are shown in Figure 1.

References

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3. "Nuclear Waste Drum Characterization with 2 MeV X-ray and Gamma-ray Tomography," Richard T. Bernardi and Harry E. Martz, Jr., *Proceedings of the SPIE's 1995 Inter-national Symposium on Optical Science, Engineering, and Instrumentation* (Vol. 2519), San Diego, CA, July 13-14, 1995.

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Rendered view of the high
resolution TCT data set

Rendered view of the
active CT data set

Rendered view of the
passive CT data set showing the
distribution of the ^{239}Pu

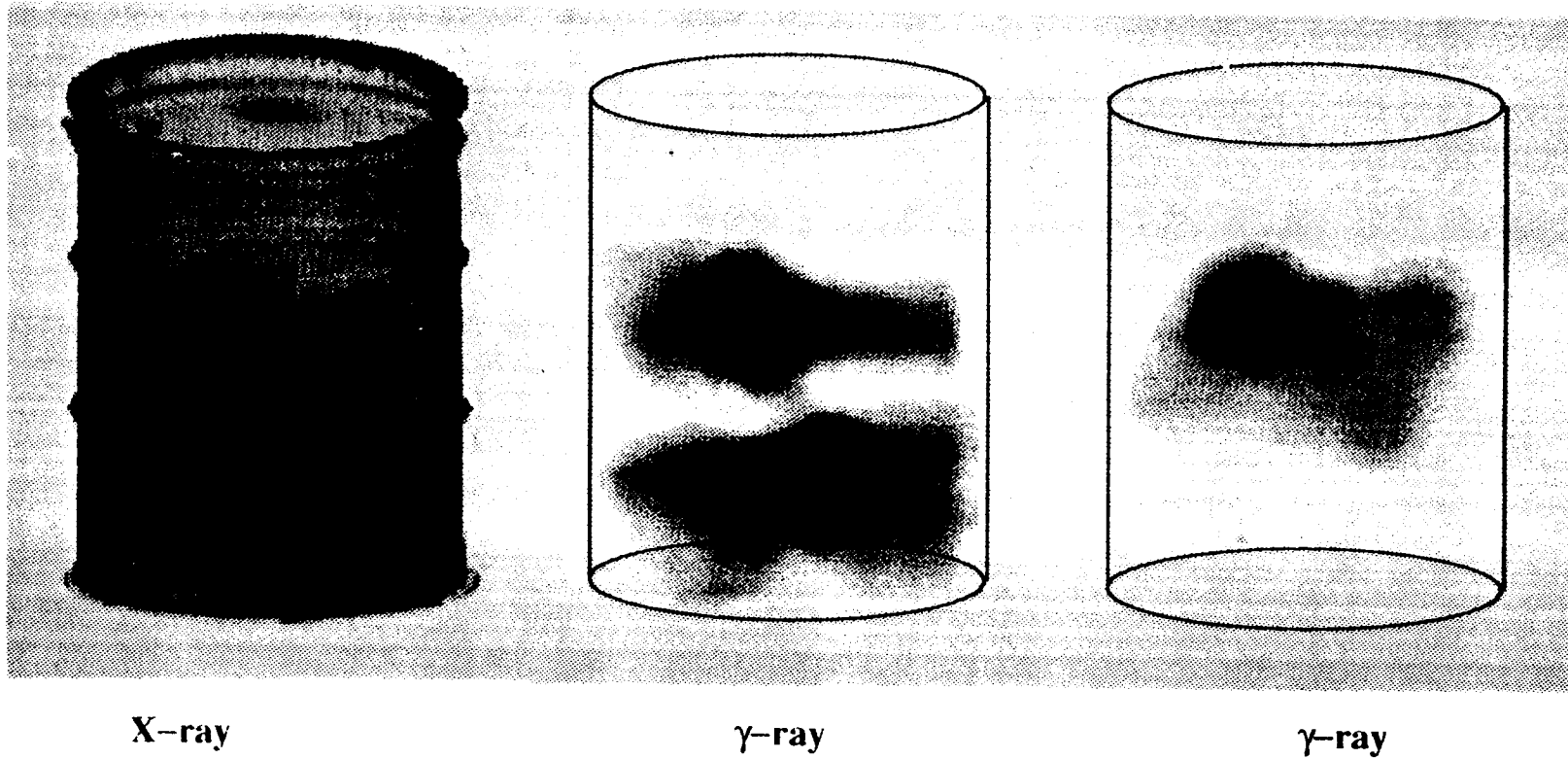


Figure 1. Representative CT images of an LLNL TRU-waste drum. A 3D rendered image of the 2 MV TCT (left), ACT at 411 keV (middle), and PCT 414 keV (right) are shown.